

Ratios and Proportions

Section 7.1

A **ratio** is a comparison of two quantities. The ratio of a to b can be expressed as $\frac{a}{b}$, where b is not 0. The ratio can also be written as $a : b$.

An equation stating that two ratios are equal is a **proportion**. Therefore, $\frac{a}{b} = \frac{c}{d}$ is a proportion for any numbers a and c and any nonzero numbers b and d . In any true proportion, the cross products are equal.

So, $\frac{a}{b} = \frac{c}{d}$ if and only if $ad = bc$.

Solve each proportion by using cross products:

1. $\frac{9}{28} = \frac{x}{84}$

2. $\frac{3}{18} = \frac{4x}{7}$

3. $\frac{x+5}{7} = \frac{x+3}{5}$

Use a proportion to solve each problem.

4. If two cassettes cost \$14.50, how much will 15 cassettes cost?

5. If a 6-foot post casts a shadow that is 8 feet long, how tall is an antenna that casts a 60-foot shadow at the same time?

Exploring Similar Polygons

Section 7.2

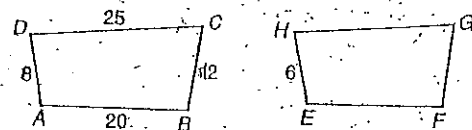
Two polygons are **similar** if and only if their corresponding angles are congruent and the measures of their corresponding sides are in proportion.

The symbol \sim means "is similar to".

The ratio of the lengths of two corresponding sides of two similar polygons is called the **scale factor**.

6. If quadrilateral ABCD is similar to quadrilateral EFGH, find each of the following:

- a) Scale factor of ABCD to EFGH



- b) EF

- c) FG

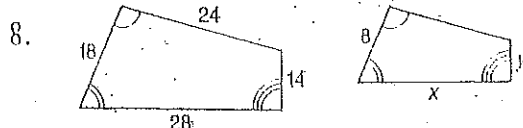
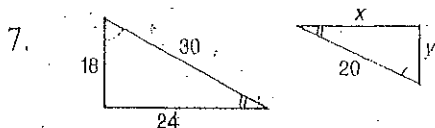
- d) GH

- e) Perimeter of ABCD

- f) perimeter of EFGH

- g) ratio of perimeter of ABCD to perimeter of EFGH

Each pair of polygons is similar. Find the values of x and y .



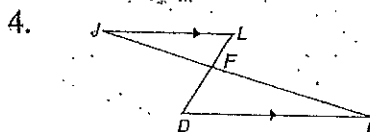
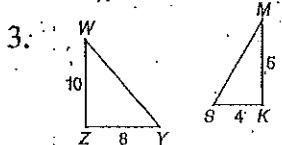
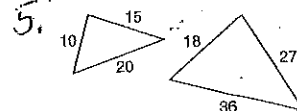
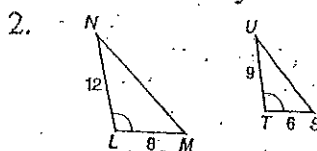
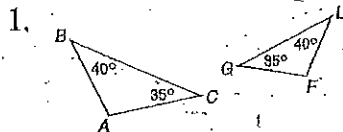
Section 7.3

Identifying Similar Triangles

There are three ways to determine whether two triangles are similar.

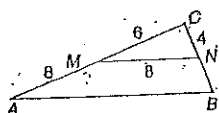
- Show that two angles of one triangle are congruent to two angles of the other triangle. AA~
- Show that the measures of the corresponding sides of the triangles are in proportion. SSS~
- Show that the measure of two sides of a triangle are proportional to the measures of the corresponding sides of the other triangle and that the included angles are congruent. SAS~

Determine whether each pair of triangles is similar. Give a reason for your answer.

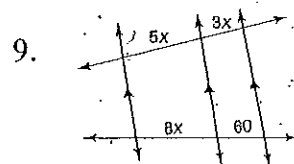
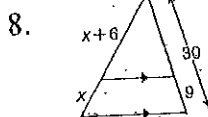
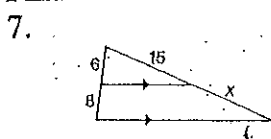


Identify the similar triangles in each figure. Explain why they are similar and find the missing measures.

6. If $MN \parallel AB$, find AB, BC, and BN



Find the value of x.



Simplify the following Radicals

1. $\sqrt{8}$

11. $-7\sqrt{40}$

21. $\frac{\sqrt{3}}{\sqrt{7}}$

31. $(2\sqrt{3})^2$

2. $\sqrt{45}$

12. $3\sqrt{175}$

22. $\sqrt{\frac{3}{2}}$

32. $(3\sqrt{5})^2$

3. $\sqrt{50}$

13. $\sqrt{\frac{4}{9}}$

23. $\sqrt{\frac{8}{32}}$

33. $\sqrt{8} + \sqrt{50}$

4. $\sqrt{98}$

14. $\sqrt{\frac{81}{100}}$

24. $\frac{\sqrt{7}}{\sqrt{14}}$

34. $\sqrt{36} - \sqrt{25}$

5. $\sqrt{125}$

15. $\sqrt{\frac{36}{9}}$

25. $\frac{3}{\sqrt{2}}$

35. $3\sqrt{12} - \sqrt{3}$

6. $\sqrt{200}$

16. $\sqrt{\frac{1}{4}}$

26. $\frac{9}{\sqrt{6}}$

36. $\sqrt{5} + \sqrt{20}$

7. $\sqrt{35}$

17. $\sqrt{\frac{1}{3}}$

27. $\frac{9}{\sqrt{45}}$

37. $\sqrt{6} \cdot \sqrt{3}$

8. $5\sqrt{18}$

18. $\sqrt{\frac{1}{2}}$

28. $\frac{\sqrt{3}}{2\sqrt{6}}$

38. $\frac{\sqrt{6}}{\sqrt{3}}$

9. $3\sqrt{28}$

19. $\sqrt{\frac{2}{3}}$

29. $(\sqrt{3})^2$

39. $5\sqrt{2} \cdot \sqrt{3}$

10. $-4\sqrt{80}$

20. $\sqrt{\frac{4}{5}}$

30. $(\sqrt{6})^2$

40. $\frac{\sqrt{5}}{\sqrt{5}}$